

**127.—REPORT OF SHAD PROPAGATION ON THE POTOMAC RIVER
DURING THE SEASON OF 1886.****By MARSHALL McDONALD.**

The organization and conduct of the work was the same, in general, as during the season of 1885. The facilities for collecting eggs were greatly improved by substituting for the launch heretofore employed in the collection service the small steamer *Lilla*, chartered for the season, but at the close of the season purchased by the U. S. Fish Commission.

The eggs collected from the fishing-shores and gilliers were transferred to the field station at Fort Washington, where they were kept and developed until hardened, so as to permit safe transportation to Central Station, Washington. Here the hatching was completed, and the distribution of the fry conveniently made by car and messenger service. Several million eggs were retained and hatched at Fort Washington for stocking waters in the immediate vicinity of the station.

COST AND RESULTS OF THE WORK.

For the conduct of the work, in accordance with the program submitted and approved, the Commissioner authorized an expenditure not to exceed \$5,000. At Fort Washington Station the actual cost of collecting, developing, and transporting the eggs was \$2,879.90; at Central Station, for hatching and distribution, \$916.55; total, \$3,796.45. The total number of eggs obtained was 36,362,000, and the losses during incubation were 6,625,000, leaving the aggregate number furnished for distribution from the Potomac River stations 29,737,000. The percentage of loss during incubation was 18 per cent, and shows marked improvement over the results of previous seasons. The cost of production was \$127.66 per million, or 78 shad for each cent of expenditure.

FORT WASHINGTON STATION.

On March 26 the station was occupied by a small force. The men were employed in tarring and rigging the seine, cleaning up the shore, and getting everything in readiness for active work when the run of shad should begin.

The first haul of the Commission seine was made April 12, and the first ripe fish was taken on the 16th. The run of fish steadily increased from that time to the 22d, as did also the proportion of ripe females. On the afternoon and night of the 22d of April 3,503,000 shad eggs were taken and impregnated. This was the maximum number taken in one day during the season. The period of maximum production was from April 20 to 27, inclusive; the total production for the period referred to being 16,017,000, or nearly one-half of the entire number obtained during the season.

The eggs which were hatched and planted in local waters (3,154,000) and forwarded to Central Station (33,208,000) were derived as follows:

From the Fish Commission seine at Fort Washington	11,848,000
From Chapman's Point hauling-seine	5,506,000
From Ferry Landing hauling-seine	4,349,000
From White House hauling-seine	1,487,000
From Stony Point hauling-seine	2,191,000
From the gilliers	10,981,000
Total	36,362,000

The records of the Commission seine fished on the Fort Washington reservation have been carefully kept, and are here published, so as to preserve important data in a shape accessible to fish-culturists generally. These show the fluctuations from season to season, not only in the aggregate catch of shad on the same shore, but also the variations in the proportion of males to females, in the time of maximum run, and in the date at which the proportion of ripe fish reaches its maximum, and the interval during which the largest numbers of eggs are taken.

Record of seine-hauling at Fort Washington shore during the season of 1886.

Left Column						Right Column							
Date.	Number of shad.	Males.	Females.	Ripe females.	Eggs taken.	Temperature of water during impregnation.	Date.	Number of shad.	Males.	Females.	Ripe females.	Eggs taken.	Temperature of water during impregnation.
April 15*	2	1	1			57	May 10†						63
16	85	58	27	3	95,000	57	11†						62
17	116	88	28	1	40,000	58	12‡	150	130	20	7	189,000	65
18	150	111	39	1	7,000	61	13	467	385	82	13	385,000	64
19	264	201	63	9	205,000	61	14¶	234	199	85	17	548,000	63
20	210	120	87	5	184,000	65	15¶	188	150	29	8	211,000	61
21	238	164	74	6	211,000	63	16*	2	2	0	0		63
22	294	194	100	10	391,000	63	17†	215	195	20	3	52,000	66
23	103	62	41	11	386,000	66	18	179	154	25	2	65,000	63
24	200	112	88	27	767,000	69	19	296	195	101	24	824,000	63
25	359	208	156	15	492,000	69	20	170	124	40	11	522,000	65
26	330	168	168	20	705,000	70	21	145	107	38	9	274,000	66
27	185	99	86	20	619,000	68	22	144	96	48	24	611,000	67
28	180	122	64	18	541,000	67	23	104	102	62	22	650,000	71
29	177	97	80	15	404,000	66	24	130	86	44	10	294,000	71
30†	166	121	45	7	195,000	65	25	65	44	21	4	131,000	70
May 1†	38	24	14	3	80,000	62	26	109	70	30	11	239,000	71
2†	289	231	58	2	21,000	63	27	109	88	21	5	161,000	69
3†	202	188	14	0		64	28	104	80	24	4	110,000	68
4	207	178	29	5	138,000	64	29	86	66	20	12	380,000	70
5	179	139	40	1	14,000	65	30	75	55	20	3	60,000	71
6†	248	192	56	10	245,000	66	31	31	19	12	6	175,000	69
7†	111	81	30	5	149,000	66	June 1**	5	3	2	0		69
8†						61							
9†						63	Total..	7,419	5,331	2,088	395	11,848,000

* Seine hauled but once.
 † One haul omitted.
 ‡ No hauls, on account of the high wind or heavy current.
 § Current lighter and running down very fast.
 ¶ Rain all day.
 * New current beginning to run.
 ** Cut seine out after first haul.

A comparison of the records of the seine-hauling in 1885 and 1886, for which seasons only we have reliable records, affords contrasts as interesting as they are perplexing. These may be summarized as follows:

Years.	Total catch.	Males.	Females.	Ripe females in total catch.	Ripe females to entire number of females.	Maximum production of eggs for entire river.	
						Date.	Period.
1885	2,696	<i>Pr. ct.</i> 45.7	<i>Pr. ct.</i> 54.3	<i>Pr. ct.</i> 9.0	<i>Pr. ct.</i> 17.0	May 16	May 5-11
1886	7,419	71.8	28.2	5.3	14.1	Apr. 22	Apr. 20-27

A considerable proportion of the excess of males was made up of small two-year-old "buck shad," called by the fishermen "skimmers," which, being too small to count, are sold by the bunch. The preponderance of these during the season gives promise of an increased run of full-sized spawning fish in 1887.

Transportation of eggs.—The transfer of impregnated eggs from Fort Washington to Central Station was made by the steamer W. W. Corcoran, plying daily between Washington and Mount Vernon, the transportation being uniformly made on trays, by the "dry method," inaugurated by me in 1881. The total number of eggs forwarded from Fort Washington Station was 33,208,000. Of these 4,925,000 died in transit.

CENTRAL STATION.

The total number of eggs received in good condition, the number of eggs and fry distributed, and the average percentage of loss in hatching are given in the following summary for the season of 1886:

Eggs transferred to other stations.....	1,586,000
Fish distributed.....	24,997,000
Eggs lost in hatching, 7 per cent.....	1,700,000
Total eggs received alive from Fort Washington.....	28,283,000

The records of the station contain a history of each lot of eggs received from the Fish Commission seine, giving the temperature of impregnation, the maximum, minimum, and mean of water temperatures during the period of incubation, and the percentage of loss in hatching, data which it is important to preserve for reference, but which it is hardly necessary to publish.

Comparison of the catch of 1885 and 1886.—The catch of shad in the Potomac varies greatly from one season to another. The aggregate number* taken in 1885 was 157,697; in 1886 it was 275,422, the increase of 1886 over the previous season being 117,725.

* See reports of Gwynn Harris, inspector of marine products, in U. S. F. C. Bulletin, Vol. V, p. 192, and Vol. VI, p. 202.